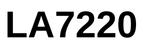
Ordering number: EN1409B

Monolithic Linear IC





Electronic Switch for VCR/Audio Use

Overview

The LA7220 is a 3-channel 2-position high-performance analog switch having wide application from audio band to video band. It is also provided with 2 channels of muting function.

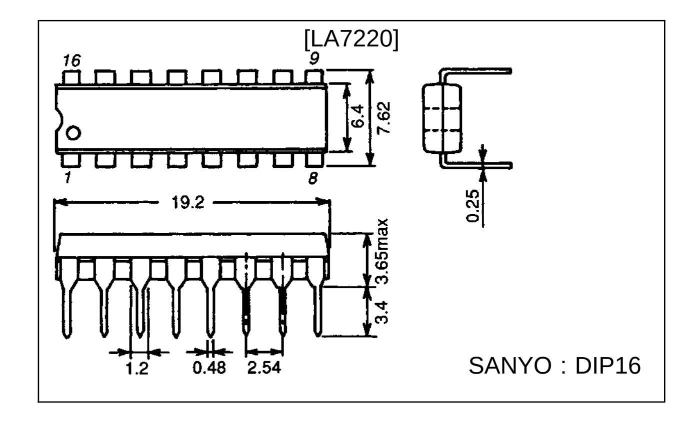
Features

- 3-channel 2-position switch
- Wide input dynamic range
- Low distortion
- Good frequency characteristic
- Muting available

Package Dimensions

unit : mm

3006B-DIP16



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		15	V
Allowable power dissipation	Pd max	Ta ≦ 65°C	500	mW
Operating temperature	Topr		–20 to +70	°C
Storage temperature	Tstg		–40 to +125	°C

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		12	V
Operating voltage range	V_{CC}op		9 to 13	V

Operating Characteristics at Ta = 25°C, V_{CC} = 12 V

Parameter		Symbol	Conditions	min	typ	max	Unit
Current drain		I_{CC}			30.0	39.9	mA
Total harmonic distortion		THD	Rg = 600 Ω, 4.5 Vp-p, f = 1 kHz, R_L= ∞, (Note 1)		0.007	0.1	%
Noise voltage		V_{NO}	Rg = 600 Ω, f = 20 Hz to 20 kHz, R_L = ∞, (Note 1)		–93	–80	dBs
Crosstalk	1ch	CR1	Input 1: Rg = 50 Ω, 2 Vp-p, f = 3.58 MHz, Input 2: Rg = 500 Ω, (Note 2)		–50		dB
	2ch	CR2	Input 1: Rg = 50 Ω, (Note 2)	–60			dB
	3ch	CR3	Input 1: Rg = 50 Ω, (Note 2)	–50			dB
Pedestal level		ΔVped	V_{CTL} (Pins 10, 13, 15) = 0 to 12 V, (Note 1)	–100		0 + 100	mV
Maximum input voltage		V_{IN} max	Rg = 600 Ω, f = 1 kHz, R_L = ∞, THD = 1%, (Note 1)	5.0			Vp-p

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Parameter		Symbol	Conditions		min	typ	max	Unit
2nd harmonic voltage		H2	Rg = 50 Ω, 4.0 Vp-p, f = 1 MHz, R_L = ∞, (Note 1)		–46	–55		dB
3rd harmonic voltage		H3	Rg = 50 Ω, 4.0 Vp-p, f = 1 MHz, R_L = ∞, (Note 1)		–46	–55		dB
Switch changeover voltage		V_{CTLS}	(Note 1)		2.6	3.1	4.0	V
Mute threshold voltage		V_{ML}	Low level, (Note 3)		1.1	1.5	1.9	V
		V_{MH}	High level, (Note 3)		6.6	7.3	8.0	V
Crosstalk between channels	1ch		Rg = 500 Ω, R_L = ∞, other channel input Rg = 50 Ω, 2 Vp-p, f = 3.58 MHz, (Note 4)		–50	–68		dB
	2ch				–50	–68		dB
	3ch				–50	–68		dB
Mute compression ratio			Rg = 600 Ω, 2 Vp-p, f = 1 kHz, R_L = ∞, series resistance 10 kΩ, (Note 3)			–60		dB
Control pin flow-in current		I_{CTL}	(Note 1)			8		µA
Input impedance		Z_{IN}	(Note 1)			10		kΩ
Output impedance		Z_{OUT}	(Note 1)			29		Ω
Pin voltage	(Pin 1)	V_{pin1}	V_{pin15} = 0 V	Test point: V14		7.9		V
			V_{pin15} = 12 V			7.9		V
	(Pin 2)	V_{pin2}		Test point: V2		7.2		V
	(Pin 5)	V_{pin5}	V_{pin13} = 0 V	Test point: V16		7.9		V
			V_{pin13} = 12 V			7.9		V
	(Pin 6)	V_{pin6}		Test point: V5		7.2		V
	(Pin 7)	V_{pin7}		Test point: V7		7.2		V
	(Pin 8)	V_{pin8}	V_{pin10} = 0 V	Test point: V18		7.9		V
			V_{pin10} = 12 V			7.9		V
	(Pin 9)	V_{pin9}	V_{pin10} = 0 V	Test point: V17		7.9		V
			V_{pin10} = 12 V			7.9		V
	(Pin 12)	V_{pin12}	V_{pin13} = 0 V	Test point: V15		7.9		V
			V_{pin13} = 12 V			7.9		V
	(Pin 16)	V_{pin16}	V_{pin15} = 0 V	Test point: V13		7.9		V
			V_{pin15} = 12 V			7.9		V

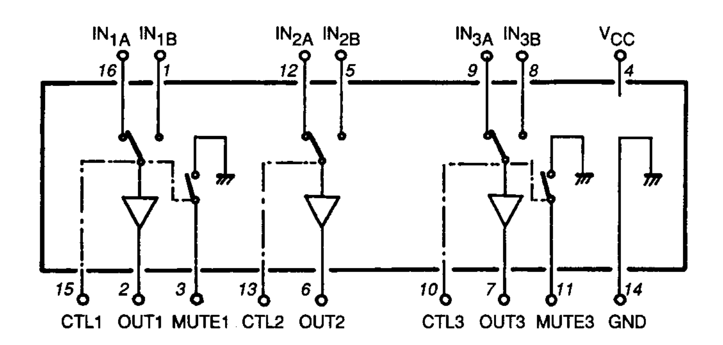
Note 1. Measurements are made for each of 1ch, 2ch, 3ch using input A and input B.
Input A: V_{CTL} (pins 10, 13, 15) is 12 V at the measurement mode.
Input B: V_{CTL} is 0 V at the measurement mode.

2. Measurements are made using input A and B.

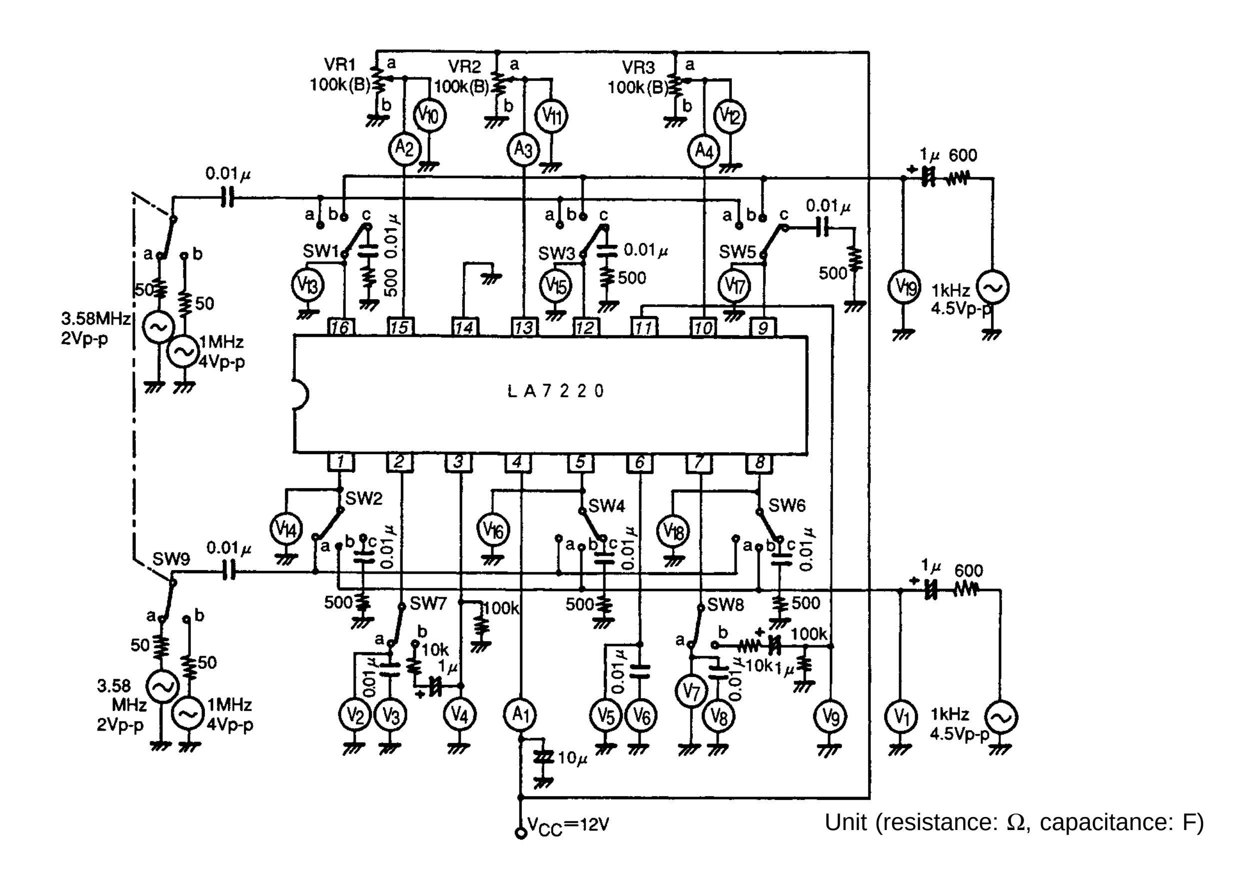
3. Measurements are made for 1ch, 3ch.

4. Measurements are made for each of 1ch, 2ch, 3ch using input A and B on other channels.

Equivalent Circuit Block Diagram



Test Circuit



Unit (resistance: Ω, capacitance: F)

Test Conditions

Item		Symbol	SW, VR mode												Test point
			SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	VR1	VR2	VR3	
Current drain		I_{CC}	c	c	c	c	c	c	a	a	a	b	b	b	A1
Total harmonic distortion	1chA	THD	b	c	c	c	c	c	a	a	a	a	b	b	V3
	1chB	THD	c	b	c	c	c	c	a	a	a	b	b	b	V3
	2chA	THD	c	c	b	c	c	c	a	a	a	b	a	b	V6
	2chB	THD	c	c	c	b	c	c	a	a	a	b	b	b	V6
	3chA	THD	c	c	c	c	b	c	a	a	a	b	b	a	V8
	3chB	THD	c	c	c	c	c	b	a	a	a	b	b	b	V8
Noise	1chA	V_{NO}	c	c	c	c	c	c	a	a	a	a	b	b	V3
	1chB	V_{NO}	c	c	c	c	c	c	a	a	a	b	b	b	V3
	2chA	V_{NO}	c	c	c	c	c	c	a	a	a	b	a	b	V6
	2chB	V_{NO}	c	c	c	c	c	c	a	a	a	b	b	b	V6
	3chA	V_{NO}	c	c	c	c	c	c	a	a	a	b	b	a	V8
	3chB	V_{NO}	c	c	c	c	c	c	a	a	a	b	b	b	V8
Crosstalk	1chA	CR	c	a	c	c	c	c	a	a	a	a	b	b	V3
	1chB	CR	a	c	c	c	c	c	a	a	a	b	b	b	V3
	2chA	CR	c	c	c	a	c	c	a	a	a	b	a	b	V6
	2chB	CR	c	c	a	c	c	c	a	a	a	b	b	b	V6
	3chA	CR	c	c	c	c	c	a	a	a	a	b	b	a	V8
	3chB	CR	c	c	c	c	a	c	a	a	a	b	b	b	V8
Pedestal level	1ch	ΔV_{PED}	c	c	c	c	c	c	a	a	a	a/b	b	b	V2
	2ch	ΔV_{PED}	c	c	c	c	c	c	a	a	a	b	a/b	b	V5
	3ch	ΔV_{PED}	c	c	c	c	c	c	a	a	a	b	b	a/b	V7

Item		Symbol	SW, VR mode												Test point
			SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	VR1	VR2	VR3	
Maximum input voltage	1chA	$V_{IN\ max}$	b	c	c	c	c	c	a	a	a	a	b	b	V19
	1chB	$V_{IN\ max}$	c	b	c	c	c	c	a	a	a	b	b	b	V1
	2chA	$V_{IN\ max}$	c	c	b	c	c	c	a	a	a	b	a	b	V19
	2chB	$V_{IN\ max}$	c	c	c	b	c	c	a	a	a	b	b	b	V1
	3chA	$V_{IN\ max}$	c	c	c	c	b	c	a	a	a	b	b	a	V19
	3chB	$V_{IN\ max}$	c	c	c	c	c	b	a	a	a	b	b	b	V1
2nd harmonic voltage	1chA	H2-1	a	c	c	c	c	c	a	a	b	a	b	b	V3
	1chB	H2-1	c	a	c	c	c	c	a	a	b	b	b	b	V3
	2chA	H2-2	c	c	a	c	c	c	a	a	b	b	a	b	V6
	2chB	H2-2	c	c	c	a	c	c	a	a	b	b	b	b	V6
	3chA	H2-3	c	c	c	c	a	c	a	a	b	b	b	a	V8
	3chB	H2-3	c	c	c	c	c	a	a	a	b	b	b	b	V8
3rd harmonic voltage	1chA	H3-1	a	c	c	c	c	c	a	a	b	a	b	b	V3
	1chB	H3-1	c	a	c	c	c	c	a	a	b	b	b	b	V3
	2chA	H3-2	c	c	a	c	c	c	a	a	b	b	a	b	V6
	2chB	H3-2	c	c	c	a	c	c	a	a	b	b	b	b	V6
	3chA	H3-3	c	c	c	c	a	c	a	a	b	b	b	a	V8
	3chB	H3-3	c	c	c	c	c	a	a	a	b	b	b	b	V8
Switch changeover voltage	1ch	V_{CTLS}	a	a	c	c	c	c	a	a	a	Var*	b	b	V10
	2ch	V_{CTLS}	c	c	a	a	c	c	a	a	a	b	Var*	b	V11
	3ch	V_{CTLS}	c	c	c	c	a	a	a	a	a	b	b	Var*	V12
Mute threshold	1ch	V_{ML}	b	b	c	c	c	c	b	a	a	Var*	b	b	V10
	1ch	V_{MH}	b	b	c	c	c	c	b	a	a	Var*	b	b	V10
	3ch	V_{ML}	c	c	c	c	b	b	a	b	a	b	b	Var*	V12
	3ch	V_{MH}	c	c	c	c	b	b	a	b	a	b	b	Var*	V12
Crosstalk between channels	1ch		c	c	c	c	a	c	a	a	a	a	a	a	V3
	1ch		c	c	c	c	c	a	a	a	a	a	a	b	V3
	1ch		c	c	c	c	a	c	a	a	a	a	b	a	V3
	1ch		c	c	c	c	c	a	a	a	a	a	b	b	V3
	1ch		c	c	a	c	c	c	a	a	a	b	a	a	V3
	1ch		c	c	a	c	c	c	a	a	a	b	a	b	V3
	1ch		c	c	c	a	c	c	a	a	a	b	b	a	V3
	1ch		c	c	c	a	c	c	a	a	a	b	b	b	V3
	2ch		c	c	c	c	a	c	a	a	a	a	a	a	V6
	2ch		c	c	c	c	c	a	a	a	a	a	a	b	V6
	2ch		c	c	c	c	a	c	a	a	a	b	a	a	V6
	2ch		c	c	c	c	c	a	a	a	a	b	a	b	V6
	2ch		a	c	c	c	c	c	a	a	a	a	b	a	V6
	2ch		a	c	c	c	c	c	a	a	a	a	b	b	V6
	2ch		c	a	c	c	c	c	a	a	a	b	b	a	V6
	2ch		c	a	c	c	c	c	a	a	a	b	b	b	V6
	3ch		c	c	a	c	c	c	a	a	a	a	a	a	V8
	3ch		c	c	c	a	c	c	a	a	a	a	b	a	V8
	3ch		c	c	a	c	c	c	a	a	a	b	a	a	V8
	3ch		c	c	c	a	c	c	a	a	a	b	b	a	V8
	3ch		a	c	c	c	c	c	a	a	a	a	a	b	V8
	3ch		a	c	c	c	c	c	a	a	a	a	b	b	V8
	3ch		c	a	c	c	c	c	a	a	a	b	a	b	V8
	3ch		c	a	c	c	c	c	a	a	a	b	b	b	V8
Mute compression ratio	1ch		b	b	c	c	c	c	b	a	a	Var*	b	b	V4
	3ch		c	c	c	c	b	b	a	b	a	b	b	Var*	V9

Item		Symbol	SW,VR mode												Test point
			SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	VR1	VR2	VR3	
Control pin flow-in current	1ch	I_{CTL1}	c	c	c	c	c	c	a	a	a	a	b	b	A2
	2ch	I_{CTL2}	c	c	c	c	c	c	a	a	a	b	a	b	A3
	3ch	I_{CTL3}	c	c	c	c	c	c	a	a	a	b	b	a	A4
Pin voltage	(Pin 1)	V_{pin1}	c	c	c	c	c	c	a	a	a	b	b	b	V14
	(Pin 1)	V_{pin1}	c	c	c	c	c	c	a	a	a	a	b	b	V14
	(Pin 2)	V_{pin2}	c	c	c	c	c	c	a	a	a	b	b	b	V2
	(Pin 5)	V_{pin5}	c	c	c	c	c	c	a	a	a	b	b	b	V16
	(Pin 5)	V_{pin5}	c	c	c	c	c	c	a	a	a	b	a	b	V16
	(Pin 6)	V_{pin6}	c	c	c	c	c	c	a	a	a	b	b	b	V5
	(Pin 7)	V_{pin7}	c	c	c	c	c	c	a	a	a	b	b	b	V7
	(Pin 8)	V_{pin8}	c	c	c	c	c	c	a	a	a	b	b	b	V18
	(Pin 8)	V_{pin8}	c	c	c	c	c	c	a	a	a	b	b	a	V18
	(Pin 9)	V_{pin9}	c	c	c	c	c	c	a	a	a	b	b	b	V17
	(Pin 9)	V_{pin9}	c	c	c	c	c	c	a	a	a	b	b	a	V17
	(Pin 12)	V_{pin12}	c	c	c	c	c	c	a	a	a	b	b	b	V15
	(Pin 12)	V_{pin12}	c	c	c	c	c	c	a	a	a	b	a	b	V15
	(Pin 16)	V_{pin16}	c	c	c	c	c	c	a	a	a	b	b	b	V13
	(Pin 16)	V_{pin16}	c	c	c	c	c	c	a	a	a	a	b	b	V13

(Note) Var*: While monitoring pins 2, 6, 7, adjust so that the minimum output is obtained.
Mute Threshold: While monitoring pins 3, 11, measure the minimum and maximum values of V10, V12 when the minimum output is obtained.

